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ABSTRACT

This study examined the possibility that not only women but also men, face a chilly classroom climate when they are students in a major that is considered nontraditional for their gender. Male and female junior and senior students (total n=426) majoring in accounting, education, engineering, or nursing at one university responded to the College Classroom Climate Survey. Analysis of variance was used to examine the relationships between the independent variables of gender and academic discipline and the interaction of gender and academic discipline and the dependent variable of perception of classroom climate. Findings indicated that, regardless of their gender, students in these majors did not perceive the climate to be "chilly." However, there was a difference in perception of classroom climate as a function of major. Specifically, both education and nursing students perceived a "warmer" classroom climate than accounting and engineering students. The pattern was the same for both males and females since there was no interaction of gender and academic discipline. (Contains 20 references.) (Author/DB)

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PERCEPTIONS OF CLASSROOM CLIMATE BY STUDENTS IN NON-TRADITIONAL MAJORS FOR THEIR GENDER

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PERCEPTIONS OF CLASSROOM CLIMATE BY STUDENTS IN NON-TRADITIONAL MAJORS FOR THEIR GENDER

ABSTRACT

This study examined the possibility that not only women, but also men, face a chilly classroom climate when they are students in a major that is considered non-traditional for their gender. The population for this study was all junior and senior students (N = 1,992) in accounting, education, engineering, and nursing at a Doctoral University I in the Midsouth. A stratified random sample of males and females was used, for a total of 426 junior and senior full-time and part-time students. These students responded to a mailed-out College Classroom Climate Survey. Analysis of variance was used to clarify the relationships between the independent variables of gender of student and academic discipline and the interaction of gender of student and academic discipline and the dependent variable of perception of the classroom climate. The findings indicated that, regardless of their gender, students in these majors did not perceive the climate to be "chilly." However, there is a difference in the perception of the classroom climate as a function of major. In particular, both education and nursing students perceived a "warmer" classroom climate than accounting and engineering students. The pattern was the same for both males and females since there was no interaction of gender and academic discipline.

INTRODUCTION

In recent years most colleges and universities have experienced an increasingly diverse student body. Presently, more women and more racial and ethnic minorities are attending college than in the past 20 years (National Center for Educational Statistics, 1975, 1994). Their presence on campus changes not only the demographic makeup of the student body but also brings into question how students are treated. The concern is that differential treatment because of gender, race or ethnicity may result in a feeling of uneasiness, reduced student motivation and classroom participation, and in some instances, a change of major or withdrawal from the institution on the part of the student.

Hall and Sandler (1982) developed the concept of a "chilly climate" to depict an unfriendly classroom environment for women. Their groundbreaking study investigated the ways that women in the classroom are "either *singled out* or *ignored* because of their sex" [italics in original] (p. 2). According to Hall and Sandler, this treatment was a major contributing factor which resulted in women questioning their abilities and being less confident than men concerning their place on the campus.

Since Hall and Sandler's (1982) seminal study of the "chilly climate," which described women's perceptions of the college classroom, there have been other studies that have attempted to investigate further the factors that may contribute to college classroom climate. Whereas Hall and

Sandler's report was based on a synthesis of existing empirical studies, reports and surveys of a variety of researchers, campus groups, and postsecondary institutions, most subsequent studies investigated the phenomenon of the "chilly climate" at a single institution. These studies questioned the perceptions of both male and female students with regard to the college classroom climate, seeking to delineate particular factors that affected the classroom climate.

In several studies the possibility was examined that factors inherent in particular academic disciplines may influence the classroom climate. Astin (1965) was one of the first to postulate that instructors in different fields of study or academic disciplines treat students differently and that this difference is perceived by the students.

Academic discipline as a variable in classroom climate is significant in light of the trend toward women entering undergraduate academic disciplines once considered male, and men entering undergraduate academic disciplines once considered female. For example, women received 14% of the engineering degrees conferred in 1992 as compared to 1% in 1972 (National Center for Educational Statistics, 1975, 1994). In 1992, 8% of the degrees conferred in nursing were to men as compared to 3% in 1972 (National Center for Educational Statistics, 1975, 1994).

Only a few studies have addressed the educational experiences of women who are in gender-atypical majors or

disciplines, such as engineering (e.g., Barrett, 1996; Ross, Volkwein, & Vogt, 1995; Rudnick, 1984). It was found that these women had experienced some form of gender discrimination (Pope, 1995), that men may resent women in this field, and that women may be discouraged from entering a male-dominated field (Morgan, 1992). Even fewer studies have addressed the educational experiences of men in gender-atypical majors or disciplines. These studies have looked at men in nursing (Galbraith, 1991; Schoenmaker & Radosevich, 1976).

With more students entering academic disciplines that were traditionally occupied by students of the opposite gender, it is important to learn whether these students feel singled out or ignored because of their minority status in these disciplines. In other words, do students experience a "chilly" or inhospitable climate in classrooms of academic disciplines where they were the minority gender?

Purpose of Study

The purpose of this study was to determine how male and female students perceived the college classroom climate in classes where they were majors in non-traditional academic disciplines for their gender.

Methodology

Subjects. The population for this study was all junior and senior, male and female, part-time and full-time undergraduate students who were enrolled as accounting, education, engineering, and nursing majors (N = 1,992) at a

public Doctoral University I institution located in a Midsouth urban setting. Only juniors and seniors were included because they have experienced the classroom climate of these academic disciplines more than first-year and sophomore students, who may not have declared a major as yet. As of the 1996 spring semester, there were 338 students (47% males, 53% females) who were declared majors at the junior and senior level in accounting, 641 students (8% males, 92% females) in education, 597 students (85% males, 15% females) in engineering, and 416 students (9% males, 91% females) in nursing.

With the exception of accounting, the majors of education, engineering, and nursing were dominated by enrollment of one gender. Accounting was selected to be one of the majors in this study because up until the recent past it was dominated by male students.

In view of the population in these academic disciplines, a stratified random sample of males to females was used (Light, Singer, & Willett, 1990). In education, engineering, and nursing, the number of gender-atypical students was used as the gauge by which the typical-gender students were selected. For example, there were 53 male junior and senior students in education. Forty-eight female junior and senior students in education were randomly selected to comprise the sample of education students for this study. The same procedure was used in selecting the sample from engineering and nursing. Although accounting students at this university

were approximately equal in number in gender distribution, a random sample of junior and senior female and males students was selected.

A total of 426 students were selected as the sample: 65 students (48% males, 52% females) in accounting, 101 students (52% males, 48% females in education, 166 students (52% males, 48% females) in engineering, and 94 students (43% males, 57% females) in nursing.

Research Design

The hypotheses were: (a) males in the typical female disciplines of nursing and education will perceive the classroom climate as more inhospitable and chilly than females in these disciplines, and (b) females in the typical male disciplines of engineering and accounting will perceive the classroom climate as more inhospitable and chilly than males in these disciplines.

A 2 x 4 factorial design used analysis of variance to clarify the hypothesized relationships between the independent variables of gender of student, academic discipline, and the interaction of gender of student, academic discipline, and the dependent variable of perception of the classroom climate. The total score across the 42 items on the questionnaire served as the dependent variable. In case of interaction among the independent variables, simple main effects analyses were conducted. When necessary, Duncan's New Multiple Range Test for unequal sample size was used to examine pairwise differences.

Materials

Instrument. The instrument used in this study was a modified version of the Campus Environment Survey (CES). The CES was developed by Leonard and Ossana (1987) to measure student's perception of differential treatment of men and women college students. The impetus for the development of the CES was Hall and Sandler's (1982) report on the "chilly climate," the Student Perception Questionnaire (Pearce, 1979), the International Self-Study for Postsecondary Education Institutions (Bogart, 1981), and The Brown Project (Leland, 1980). The original version of the CES was an 86-item inventory which assessed students' perceptions and experiences of the campus environment with regard to gender discrimination. Leonard and Ossana revised the CES several times to derive a 41-item questionnaire, with each item rated on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Leonard and Ossana's version of the CES, Form O, attempted to delineate the factors that, in general, may contribute to the overall perception the college environment. A modified version of Form O of the CES was used in this study. For example, in all the questions, the phrase "in my major" was added so that the students would respond to the questions in the context of their experiences and perceptions of classes and faculty interaction exclusively within their major. Also, gender, academic discipline, age, class rank, race/ethnicity, and grade point average were asked as demographic information on the

questionnaire. The modified version of the CES, Form O, was renamed College Classroom Climate Survey and has 42 items. There was also a space provided that asked students for further comments concerning their classroom experiences.

For analysis purposes, the subcategories of early childhood and elementary education were collapsed into one category of "education." The same procedure was used for the subcategories of engineering technology, biomedical, civil, electrical, and mechanical engineering. These were collapsed into one category of "engineering."

Results

The College Classroom Climate Survey was mailed to the students at their place of residence. After two mailings and a postcard reminder, a response rate of 62% (264 questionnaires) was achieved. Of these, 233 (55%) were completed and usable questionnaires. Preliminary analysis revealed two cases, a male engineering student and a female education student, whose responses were in extreme ranges from the other responses. Analysis of the data was performed with and without these outliers. The results of the analysis were essentially the same in both instances. Therefore, these outliers were eliminated from the final analysis, resulting in 231 (54%) usable questionnaires.

The final sample consisted of 231 undergraduate junior and senior students in the following academic disciplines: 31 accounting students (20 females and 11 males); 56 education students (31 females and 25 males); 96 engineering students

(51 females and 45 males); and 48 nursing students (24 females and 24 males). Seventy-two students responded to the request for comments regarding the classroom climate issues in their majors.

To determine internal consistency of the CCCS questionnaire items, a reliability analysis was conducted and Cronbach's alpha measuring internal consistency was computed using all 42 questionnaire items. From the summary statistics it was noted that two items were negatively related to the scale. Examination of these two items revealed that it was difficult to decide what a "positive" response would be. Therefore, these two items were deleted and the scale was calculated by averaging across the 40 remaining items. The internal consistency of this scale was .8731.

Table 1 gives the means and standard deviations for each gender, academic discipline, and combination of gender and academic discipline.

Table 1

Means and Standard Deviations for Perception of Classroom Climate

	Females	n	Males	n	Total	n
Accounting	3.686	20	3.752	11	3.710	31
	(.334)		(.539)		(.411)	
Education	3.867	31	3.957	25	3.907	56
	(.307)		(.416)		(.359)	
Engineering	3.736	51	3.766	45	3.750	96
	(.441)		(.302)		(.380)	
Nursing	3.962	24	3.840	24	3.901	48
	(.321)		(.390)		(.358)	
Total	3.815	126	3.793	105		231
	(.401)		(.399)			

As Table 2 indicates, there was no significant interaction between gender of student and academic discipline ($p > .05$). This indicates that differences between females and males in their perception of the classroom climate did not depend on their academic discipline. Similarly, any academic discipline differences did not depend on whether females or males responded. There was no gender effect ($p > .05$) indicating that the perception of the classroom climate did not differ for females and males, but there was an academic discipline effect ($p < .05$) indicating that the perception of the classroom climate was different across some disciplines.

Because of the small sample size and unequal n in the academic disciplines, and in order to determine which academic disciplines differed in perception of classroom climate, Duncan's New Multiple Range Test for evaluating post-hoc pairwise comparisons was performed. Table 3 indicates the calculated effect sizes where pairwise significant differences were found. These effect sizes represent the difference between the groups expressed in standard deviation units. These results indicate that both accounting and engineering students perceive a "cooler" classroom climate than education or nursing students (see Table 1).

There is a difference in the perception of the climate as a function of major. In particular, both accounting and engineering students perceive a less "warm" climate than

education or nursing students. The pattern is the same for both females and males since there is no interaction of gender and in none of the majors is the climate perceived to be "chilly" since all means are greater than 3.00 (1.00 = strongly disagree; 2.00 = disagree; 3.00 = neither agree nor disagree; 4.00 = agree; 5.00 = strongly agree), which is neutral.

Table 2

Summary of Analysis of Variance

	SS	DF	MS	F	Sig of F
Within Cells	31.59	223	.14		
Gender	.01	1	.01	.09	.769
Major	1.53	3	.51	3.59	.014*
Gender x Major	.32	3	.11	.76	.517

*$p < .05$

Table 3

Duncan's New Multiple Range Test[a]

Groups	Accounting	Engineering	Nursing	Education
Accounting				
Engineering	.740			
Nursing	3.136*	3.223*		
	(.51)	(.41)		
Education	3.338*	3.535)*	.125	
	(.53)	(.42)		

*$p < .05$

[a]effect sizes for significant differences are given in parentheses

In sum, the research hypotheses that (a) males in nursing and education will perceive the classroom climate as more inhospitable than females in these academic disciplines; and (b) females in engineering and accounting will perceive the classroom climate as more inhospitable than males in these academic disciplines were not supported. Instead, students in each of the disciplines reported hospitable and warm classroom climates. There was no statistically significant difference between female and male students' perceptions of the classroom climate. There was, however, some difference by academic discipline in the perception of the classroom climate independent of gender.

Discussion and Implications

Like previous studies, the present study found differences in perception of the classroom climate, not as a function of gender, but as a function of academic discipline. Over thirty years ago Astin (1965) observed differences in perception of the classroom climate among academic disciplines. These differences were influenced by both the instructor's traits and behaviors and by the student's characteristics entering the academic discipline. More recently, Constantinople, Cornelius, and Gray (1988) and Cornelius, Gray, and Constantinople (1990) found that academic discipline had significant effects on the perception of the classroom climate.

Although the present study found differences in the perception of the classroom climate among the academic

disciplines, these differences were not perceived to contribute to a "chilly climate." In other words, the overall findings of this study do not support the concept of the "chilly climate" as described by Hall and Sandler (1982). Perhaps one explanation for the difference in findings between this study and Hall and Sandler's, is that the Hall and Sandler report was published in 1982, and 15 years have transpired since that report and the present study. Issues concerning equal opportunities for both males and females have gained much attention during these intervening years. Presumably faculty have become more sensitive to the needs of males and females particularly in academic disciplines that historically have been dominated by one gender. Likewise, students have become more accustomed to being in classes that include both men and women.

A second explanation for the difference in findings is that Hall and Sandler's report was based on a synthesis of existing literature and anecdotal information solicited nationally from women on college campuses. The present study reflects findings based on data gathered from one institution through a survey of randomly selected male and female students in four disciplines.

The findings of this study also are consistent with other studies conducted since Hall and Sandler's report. In the intervening years between Hall and Sandler's report and the present, many studies have been conducted to investigate the notion of a "chilly climate" on college campuses and in

the college classroom. Three years after Hall and Sandler's report, Heller, Puff, and Mills (1985) found no significant differences between males' and females' perceptions of the college classroom climate. Constantinople et, al. (1988), Cornelius et al. (1990), and Crawford and Macleod (1990) also found no significant differences in males' and females' perceptions of differential treatment by faculty in the college classroom. The present study confirms the findings of these research-based studies. Based on the findings of these studies and the present study, findings contradictory to Hall and Sandler's report, there is reason to question the validity of the "chilly climate" scenario in today's college classrooms.

There are several possibilities for future research. Since a number of studies have used gender of the instructor as one factor that affects classroom climate (e.g., Rosenfeld & Jarrard, 1985), future research could probe students' perceptions of classroom climate in courses taught by faculty whose gender is non-traditional for the particular discipline. Another potential area for research would be a longitudinal study spanning students' undergraduate experiences in their majors. In this way, changes in perceptions over time would be captured. Also, a study which included several types of higher education institutions would possibly yield results that may give a broader picture of classroom climate. If the results showed no gender differences in the perceptions of the classroom climate, this

may be an indication that faculty and students in a variety of institutional types have become more accepting and supportive of gender diversity within majors. Finally, a qualitative study incorporating researcher observations of classroom interactions and student interviews might yield another layer in examining the dynamics that influence college classroom climate.

Limitations of the Study

Generalizability is limited not only by the data being gathered from a single institution at one point in time, but also by the sample not being representative of the population of students in each of the disciplines studied. Except for accounting, the atypical gender was overrepresented in the sample. Also, respondents were not representative of the gender proportions in the sample for some of the disciplines and greater percentages of women responded in accounting, education, and engineering. Therefore generalization of the results to the full population would not be prudent.

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